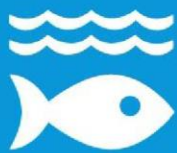


# LESSON ELEVEN

For Educators

SUSTAINABLE  
DEVELOPMENT  
GOAL #14, LIFE  
BELOW WATER

14 LIFE BELOW  
WATER



Conserve and sustainably  
use the oceans, seas and  
marine resources for  
sustainable development



IMAGE BY  
ISTOCK

# Lesson 11: Sustainable Development Goal #14: Life Below Water

## Student Handout

### Module Driving Question: Lessons 10, 11, and 12

*(Note: Choose one or both of the following module driving questions depending on your goals)*

- How can individuals and communities develop sustainable practices and technologies to effectively protect the biodiversity of our planet?
- Why is it important for local and global communities to work together to address our world's resource and ecological needs?

### Lesson Driving Questions

- How has climate change contributed to sea level rise, and what are the potential impacts of these changes on coastal communities and marine ecosystems around the world?
- What are the effects of plastic pollution and other contaminants on marine life and human health globally, and how does ocean acidification exacerbate these issues?
- How does overfishing disrupt the world's ocean's food web and what are the long-term consequences for marine biodiversity?

### Learning Targets – I Can:

- Identify and explain why conserving and sustainably using the world's oceans, seas, and marine resources is necessary for human and other species life on Earth.
- Evaluate and explain how the Earth's oceans are essential to supporting the world's economic, social, health, and ecological needs.
- Identify challenges to our world's bodies of water and develop mitigating solutions to protect life below water.

### Purpose

In this lesson, you will explore United Nations Sustainable Development Goal #14: Life Below Water. You will engage in a series of individual and collaborative learning activities that target the importance of conserving and sustainably using the world's oceans, seas, and marine resources. Working in small groups, you will assess how the challenges facing our world's oceans can be mitigated by proactive policies and collective action. As part of this learning process, you can choose to evaluate the impact of plastic waste, garbage, warming oceans, greater acidification, or damaged coastal ecosystems. Therefore, you will research the impact of various pollutants in our oceans, seas, and other bodies of water, and consider how individuals and societies can support biodiversity. While making connections between "life below water" and our health, economic interests, or climate change, you will examine local, national, and global organizations who are contributing to the sustainability of our waterways. Overall, this lesson will help you learn more about the sustainability of our oceans and why it plays an essential role in our future.

## Lesson Vocabulary

Plastic waste, nutrient pollution, marine debris, ocean acidification, anthropological climate-change, carbon sink, conservation, ecosystem, biodiversity, natural resources, biofuels, marine heatwaves, CO<sub>2</sub> emissions, oxygen depletion, thermal expansion, putrefaction, Great Pacific Garbage Patch, microplastics, ocean food web, hypoxia.

## Lesson Steps

**1. Warm-Up Activity:** In small groups (3-4), **reflect** on the critical importance of the world's oceans. **Discuss** the essential functions and services they provide, such as enabling travel and trade, sustaining ecosystems, and supporting biodiversity. **Create** a pictorial or brief visual (*could be a mini diagram*) that captures your group's discussion and main insights. Be prepared to share your visual with the class.

**2.** After sharing and hearing from your classmates about the essential functions and services the world's oceans provide, take a moment to **reflect** (*in your notebook*) on the ways the ocean has **impacted your own life** and why you feel it is critical to preserve them. In many ways, we all share a personal connection to the ocean, whether through **recreation, sustenance, or cultural significance**. Your teacher will provide several prompts to help guide your reflection.

**Select a partner** to share your reflection with. **Discuss your thoughts and listen to your partner's insights**, exploring how your experiences and perspectives might align or differ.

**3. Exploring Anthropological Impacts on the Ocean:** Now that you've had time to reflect on the importance of the world's oceans on a large scale and on a personal level, **check out** the following [video](#) centering the [United Nations Sustainable Development Goal \(SDG\) #14: Life Below Water](#). **As a class, discuss** the three targets highlighted in the video (**14.1, 14.3, & 14.4**) and **examine the ways** humans have contributed to the current state of the world's oceans. *What are the potential long-term consequences for both the environment and human society if efforts to preserve the world's oceans are not implemented immediately? What proactive measures can be taken to enhance and sustain the way humans interact with the ocean?*

**4. Diving Deeper into SDG #14 Targets:** SDG #14, Life Below Water, encompasses a total of **10 critical targets**. Having already examined **targets 14.1, 14.3, and 14.4** as a class, it's now time to **delve deeper** into the remaining targets. **Visit** the [SDG #14: Life Below Water page](#) on the UN Website **and select two additional targets** not previously discussed to review. **Conduct** an in-depth exploration of these targets and **prepare to share** your findings in small groups (3-4). **Use** the provided graphic organizer to structure and collect your insights. Check-out this additional video, "[SDG 14 Life Below Water - UN Sustainable Development Goals - DEEP DIVE](#)" for a more in-depth look into SDG #14.

**5. Mapping the World's Oceans – An Exploration of Earth's Major Water Bodies:** With a deeper understanding of SDG #14 and its critical targets, it's essential to **familiarize yourself** with the world's oceans and their **pivotal roles in our social, economic, and political** systems. **Utilize** the provided worksheet to **identify each of the world's oceans** and **investigate** the significant global role of **an ocean or body of water of your choosing**. For example, consider the economic impact of the South China Sea, essential for facilitating

trillions of dollars in global trade annually and transporting crucial energy supplies like oil and natural gas. *Reflect on the environmental challenges this body of water faces due to its service. How are individuals and organizations combatting climate impacts specific to this region? Carefully consider this section as you will use this worksheet as a foundational outline for a larger project at the conclusion of this lesson.*

**6. Exploration versus Exploitation? The Role of Oceans in Shaping the Future: Complete the first two sections** of the provided **KWL chart** highlighting what you already know about ocean exploration and its motivations, as well as what you would like to know regarding current global projects or initiatives that require ocean exploration.

As a class, you will **watch the following DW Documentary**, "[How Humans are Exploiting the Oceans](#)" (2023) for a firsthand look into the realities of the current state of our world's oceans, the ocean's role in the development of new materials and resources for humanity, and the organizations and people working to ensure that ocean exploration and experimentation are sustainable and not dangerous to the ocean's wildlife and ecosystem. **Think about the pros and cons of ocean exploration.** *How does ocean exploration impact the economy and people's livelihoods?*

After the documentary, **complete the final section of the chart**, highlighting your **main takeaways** from the documentary and memorable points. **Select a partner to discuss your conclusions with.**

**7. Oceanic Wildlife Exploration Challenge:** Reflecting on your map of the world's oceans worksheet, **choose a marine animal native to your selected body of water.** Investigate the animal's significance within the ocean's ecosystem, the challenges it confronts due to ocean exploration and climate change, and the potential consequences for the ocean if this species becomes endangered. **Develop 5 clues** about your chosen marine animal based on your research encompassing these topics. The class will be separated into **two teams.** **Each student** will present their clues, aiming to provide their classmates with enough information to **correctly guess the animal.** The team with the most correct guesses wins the challenge.

**8. Student Presentations | Planning:** Now that you have selected an ocean/region/body of water, a social/economic/political focus, and an important marine species for the region, it's time to **prepare a 5-minute presentation** to share this knowledge with your classmates. **Utilize** the research and data gathered during this lesson to create a presentation using **PowerPoint, Canva, Prezi, or another platform.**

**Your presentation should:**

- **Examine Key Topics:** *Discuss the chosen ocean/region/body of water, its social/economic/political significance, and the importance of the selected marine species.*
- **Local to Global Connection:** *Connect the issues in your chosen region to their global impact. Highlight why these issues matter locally and how they resonate globally.*
- **Propose Action Steps:** *Provide actionable steps for your peers to raise awareness about these regional issues. Suggest ways they can take individual actions to contribute to ocean protection efforts.*

Take the time to **craft a compelling and informative** presentation that **educates and inspires** your classmates to **take action** for ocean conservation.

**9. Presentation Time! Share** your prepared presentation with the class. Ensure you **pace yourself** effectively, allowing a minute or two at the end for your **peers to ask questions** and engage in discussion.

10. **Apply** what you have learned about the **UN SDG #14** by completing one of the **summative assessments** identified by your teacher. For example, explore further by investigating local organizations in Washington State/Pacific Northwest that are addressing ocean preservation. See the organizations listed in lesson resources.

## Teacher Preparation Notes

**Pacing and Strategy:** The following outline provides a guide for teaching this lesson including approximate times (*may vary*), teaching strategies, suggested information for teacher created slides, and options for additional enrichment activities/summative assessments can be found at the end of the modules. This curriculum model was designed with teaching and learning strategies that could be adapted for in-person or virtual learning.

**Lesson Timing:** 6 hours (*approximate*)

### Standards

Content	Standard
<a href="#">WA Social Studies</a>	<p><b>SSS1.6-8.1:</b> Analyze positions and evidence supporting an issue or an event.</p> <p><b>SSS3.6-8.1:</b> Engage in discussion, analyzing multiple viewpoints on public issues.</p> <p><b>G2.9-10.1:</b> Analyze human interaction with the environment across the world in the past or present.</p> <p><b>G2.9-10:</b> Explain that humans cope with and adapt to environmental conditions.</p>
<a href="#">Next Generation Science Standards</a>	<p><b>HS-PS4-4:</b> Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p> <p><b>HS-ESS3-1.</b> Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity</p> <p><b>HS-ESS3-1:</b> Cause and Effect: Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.</p>
<a href="#">C3 Framework</a>	<p><b>D2.Geo.4.9-12:</b> Analyze relationships and interactions within and between human and physical systems to explain reciprocal influences that occur among them.</p> <p><b>D2.Geo.9.9-12:</b> Evaluate the influence of long-term climate variability on human migration and settlement patterns, resource use, and land uses at local-to-global scales.</p> <p><b>D2.Geo.10.9-12.</b> Evaluate how changes in the environmental and cultural characteristics of a place or region influence spatial patterns of trade and land use.</p> <p><b>D2.Eco.15.9-12.</b> Explain how current globalization trends and policies affect economic growth, labor markets, rights of citizens, the environment, and resource and income distribution in different nations.</p>

### Lesson Resources

For Students	For Educators	Materials
<ul style="list-style-type: none"> <li>• KWL Chart</li> <li>• Graphic Organizer</li> <li>• Research Notes Worksheet</li> </ul>	<ul style="list-style-type: none"> <li>• Lesson Eleven Slide Outline</li> <li>• KWL Chart</li> <li>• Graphic Organizer</li> </ul>	<ul style="list-style-type: none"> <li>• KWL Chart</li> <li>• Graphic Organizer</li> <li>• Research Notes Worksheet</li> <li>• Summative Assessment Options</li> </ul>

<ul style="list-style-type: none"> <li>• UN Links to infographics and videos (<i>see lesson details</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• UN Links to infographics and videos (<i>see lesson details</i>)</li> </ul>	
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## Lesson Overview

In this lesson, students explore United Nations Sustainable Development Goal #14: Life Below Water. Students will engage in a series of individual and collaborative learning activities that target the importance of conserving and sustainably using the world’s oceans, seas, and marine resources. Students will work in small groups to assess how the challenges facing our world’s oceans can be mitigated by proactive policies and collective action. As part of this learning process, students can choose to evaluate the impact of plastic waste, garbage, warming oceans, greater acidification, or damaged coastal ecosystems. Therefore, students will research the impact of various pollutants in our oceans, seas, and other bodies of water, and consider how individuals and societies can support biodiversity. While making connections between “life below water” and our health, economic interests, or climate change, students will examine local, national, and global organizations who are contributing to the sustainability of our waterways. Overall, this lesson will engage students in learning more about the sustainability of our oceans and why it plays an essential role in our future.

## Teacher Preparation

**For Step 1:** Review the [United Nations \(UN\) Sustainable Development Goals \(SDGs\)](#) through the following link. Take time to delve into [SDG #14: Life Below Water](#) and its targets, as this will prepare you to guide your students with their upcoming assignments and activities.

**For Step 2: Gather posters, markers, and other materials necessary** for the group activity. Create a prompt sheet outlining discussion points on the critical importance of oceans, such as their role in enabling travel, trade, sustaining ecosystems, and supporting biodiversity. Organize your students into small groups of 3-4, introduce the topic clearly, and monitor discussions to ensure active participation and guide conversations as needed. Be sure to allocate sufficient time for groups to create posters and prepare for a class-wide sharing session where groups present their insights.

**For Step 3: Provide prompts or questions** that guide students to reflect on their personal connections to the ocean, considering aspects like **recreation, sustenance, and cultural significance**. Consider the following,

- **Personal Connection:** *How have you experienced the ocean in your life? Think about activities like swimming, fishing, travel, or simply enjoying a beach.*
- **Sustenance:** *Do you or your family rely on the ocean for food? Reflect on the importance of seafood in your diet.*
- **Cultural Significance:** *Are there cultural traditions or memories tied to the ocean that hold special meaning for you?*
- **Importance of Protection:** *Why do you believe it's important to learn about the ocean's current challenges? How do you think we can contribute to its conservation?*



- **Future Generations:** *How do you envision the ocean's role for future generations, and what actions can we take now to ensure its health and vitality?*

**Encourage** students to choose a partner to share their reflections with, fostering discussions where students can explore how their experiences and perspectives align or differ.

**For Step 4:** Watch the following video, "[Sustainable Development Goal 14 - Life Below Water – Tracy Rogers](#)" beforehand and **develop discussion questions** based on **SDG #14 targets 14.1, 14.3, and 14.4** which center anthropological impacts on the world's oceans. During the class session, introduce the video, **facilitate a focused viewing, and pause for discussions or reflections as necessary**. Following the video, lead a **structured discussion** on the targets and their implications, guiding students to explore proactive measures **for sustainable ocean interactions**.

**For Step 5:** Familiarize yourself with **all 10 targets of SDG #14** and prepare the graphic organizers provided (*alter as needed*) for students to use during their research and small group discussions. Provide access to resources like the [UN SDG #14 website](#) for students to research two targets of their choosing independently, and monitor each students' progress to ensure understanding and synthesis of information. Divide students into small groups and encourage them to share their findings with their classmates. For additional insight in SDG #14, watch the following video, "[SDG 14 Life Below Water - UN Sustainable Development Goals - DEEP DIVE.](#)"

**For Step 6:** Prepare the provided worksheets (*alter as needed*) for students to identify and research the world's oceans. Research examples of **social, economic, political, and environmental impacts** of major oceans or bodies of water around the world to provide students with examples. During the activity, guide students in identifying and researching **significant global roles of selected oceans or bodies of water**. **Facilitate discussions** on environmental challenges and conservation efforts related to these regions and encourage critical thinking about climate impacts and conservation strategies. **Be sure to emphasize that this worksheet will be the foundation of their student presentations at the end of the lesson.**

**For Step 7:** Prepare the KWL chart for students to complete (*alter as needed*). Take the time to **watch the chosen documentary**, "[How Humans are Exploiting the Oceans,](#)" (2023) beforehand for content and relevance. During class, introduce the **KWL chart activity**, explain its purpose, and guide students in completing the first two sections based on their prior knowledge and questions about ocean exploration. Following the documentary viewing, facilitate completion of the final section of the KWL chart based on student insights, organizing partner discussions for sharing conclusions and insights. **Note:** *The documentary is approximately, 1 ½ hours and will most likely require two class periods to complete.*

**For Step 8:** Prepare guidelines and examples for creating clues about marine animals and gather materials or resources on marine biodiversity and conservation. Assign students to choose and research a marine animal from the same region they selected for the "**Mapping the World's Oceans**" activity and monitor and assist students in developing clues based on their research findings. Before the challenge, **divide your class into two teams**. During the challenge, facilitate presentations where each student presents their clues, aiming to educate classmates about marine biodiversity and conservation efforts. Each team will be allowed **three guesses per student presentation**. It could be a good idea to have a **small prize** for the winning team.



**For Step 9: Provide clear guidelines, rubrics, and resources** for creating presentations using platforms like PowerPoint, Canva, or Prezi. Review the requirements and expectations for the presentations and offer guidance on structuring content effectively. **Refer students back to their previous KWL charts and worksheets for additional context.** Facilitate peer feedback sessions or rehearsals to refine presentations and organize the presentation day, ensuring each student has an opportunity to share their project effectively.

**For Step 10: Set up the classroom** for presentations with appropriate technology and seating arrangements. Allocate time for each presentation and Q&A sessions, ensuring a supportive and engaged audience. **Introduce the presentation session,** review the order of presentations, and facilitate the presentations, managing Q&A sessions to encourage classmates to ask questions and engage with presenters effectively.

**For Step 11:** If you are going to assign one of the summative activities, review the options and see what options you would like to make available to students.

## Lesson Plan in Detail

### Step One: Introduction to SDGs, SDG #14: Life Below Water, & Collaborative Exploration: 20 minutes

**Purpose:** Students are encouraged to discuss the oceans' essential functions and services, such as enabling travel and trade, sustaining ecosystems, and supporting biodiversity. Each group will create a poster capturing their discussion and insights, which they will then share with the class. The purpose is to warm up the class and initiate a collaborative exploration of the oceans' significance.

**Slide 1:** UN SDG overview slide of the 17 goals. Overview slide of SDG #14. Prompt for small group discussion and instructions for creating supplemental poster.

### Step Two: Personal Reflection and Partner Discussion: 15 minutes

**Purpose:** After sharing insights from the warm-up activity, students will individually reflect on how the ocean has impacted their own lives and why it is crucial to preserve it. Provide students with prompts to guide their reflection on personal connections, sustenance, cultural significance, the importance of protection, and future generations. Students will then partner up to share and discuss their reflections, fostering a deeper understanding through personal and shared experiences.

**Slide 2:** Activity instructions and reflection prompts.

### Step Three: Exploring Anthropological Impacts on the Ocean: 25 minutes

**Purpose:** Students will watch a [video](#) on the United Nations Sustainable Development Goal (SDG) #14: Life Below Water, focusing on three specific targets (14.1, 14.3, and 14.4). The class will discuss how human activities have contributed to the current state of the world's oceans and explore the potential long-term consequences for the environment and human society if preservation efforts are not implemented. They will also discuss proactive measures to improve human interaction with the ocean.

**Slide 3:** Embedded YouTube video, <https://www.youtube.com/watch?v=u75w751uzoQ>. Infographics and links to UN SDG #14 Targets 14.1, 14.3, and 14.4. Proactive measures to improve anthropological impacts on the ocean.

#### **Step Four: Diving Deeper into SDG #14 Targets: 30 minutes**

**Purpose:** Students will delve deeper into SDG #14, which includes 10 critical targets. They will visit the [SDG #14: Life Below Water page](#) on the UN website, select two additional targets not previously discussed, and conduct an in-depth exploration of these targets. Using a graphic organizer, they will collect their insights and prepare to share their findings in small groups. An additional video will provide further context and information.

**Slide 4:** Infographics for the remaining seven targets for SDG #14. Additional Embedded [video centering SDG #14](#) if time permits.

#### **Step Five: Mapping the World's Oceans – An Exploration of Earth's Major Water Bodies: 45 minutes**

**Purpose:** Students will use a worksheet to identify each of the world's oceans and research their significant global roles, for example, the global economic impact of the South China Sea. They will reflect on the environmental challenges these bodies of water face and the efforts by individuals and organizations to combat climate impacts. This worksheet will serve as a foundational outline for a larger project at the lesson's conclusion.

**Slide 5:** Include a map of the world's oceans/significant bodies of water. Include examples of **social, economic, political, and environmental impacts** on major oceans or bodies of water around the world that are providing an essential function to a region/the world.

#### **Step Six: Exploration versus Exploitation? The Role of Oceans in Shaping the Future: 110 minutes**

**Purpose:** Using a KWL chart, students will document what they know about ocean exploration and its motivations, as well as what they want to learn about current global projects necessitating ocean exploration. They will watch a [documentary on human exploitation of the oceans](#) and reflect on the pros and cons of ocean exploration, its economic impact, and its effect on people's livelihoods. After the documentary, they will complete the final section of the chart, discuss their main takeaways with a partner, and share their conclusions.

**Note:** that this step will take two class periods to complete.

**Slide 6:** Provide directions for students to complete the KWL chart. This slide can include questions about what students already know about ocean exploration and what they would like to learn about global projects utilizing the ocean. Embedded [YouTube video](#) and final slide to share directions for the final section of the KWL chart.

#### **Step Seven: Oceanic Wildlife Exploration Challenge: 30 minutes**

**Purpose:** Students will select a marine animal native to a chosen body of water and investigate its significance within the ocean's ecosystem, the challenges it faces due to exploration and climate change, and the potential consequences of its endangerment. They will create 5 clues based on their research and present them in a class guessing game, divided into two teams. The goal is to provide enough information for classmates to guess the animal correctly.

**Slide 7:** Provide instructions for the Oceanic Wildlife Exploration Challenge. Include guidelines and examples for creating clues about marine animals and gather materials or resources on marine biodiversity and conservation.

### Step Eight: Student Presentations | Planning: 45 minutes

**Purpose:** Students will prepare a 5-minute presentation on the ocean/region/body of water they selected during the “Mapping the World’s Oceans activity,” focusing on its social, economic, or political significance and an important marine species. The presentation should connect local issues to global impacts and propose actionable steps for raising awareness and contributing to ocean protection. They will use the research and data gathered throughout this lesson to create a compelling and informative presentation using PowerPoint, Canva, Prezi, or another platform.

**Slide 8:** Include clear guidelines, rubrics, and resources to support students in creating their presentations. Include requirements and expectations for the presentations and offer guidance on structuring content effectively.

### Step Nine: Presentation Time! 45 minutes

**Purpose:** Students will present their findings to the class, ensuring they pace themselves effectively and leave time for questions and discussion. This step allows students to showcase their understanding, share insights, and engage with their peers on the importance of ocean conservation. **Note:** *This could take more than one class period.*

**Slide 9:** Presentation schedule. Embedded video timer.

### Step Ten: Summative Assessments: Time Will Vary

**Purpose:** There are different summative assessment options that allow students to demonstrate their learning in an innovative way. Students can choose from one of the project-based assessments identified in the appendix of this document. These projects allow students to further reflect on their understanding of SDG #14: Life Below Water and teachers can share this work with other students.

**Slide 10:** Give an overview of the summative assessment opportunities (*project-based learning*).

### Explore Further: Connecting the Local and the Global

The UN Sustainable Development Goals provide a great teaching opportunity to connect the “local” to the “global.” In this context, students can explore local organizations that are working on ocean preservation in Washington State/the Pacific Northwest. In addition, educators can teach about the important role of NGOs or non-profit organizations in addressing local and global issues.

To start, here are some local organizations that work to combat climate change and preserve the Pacific Ocean:

- [The Nature Conservatory – Oceans](#)
- [Washington State Department of Ecology – Ocean Management](#)
- [Puget Sound Keeper Alliance](#)
- [We are Oceans Initiative](#)
- [Seattle Aquarium](#)
- [Washington CoastSavers](#)
- [National Oceanic and Atmospheric Administration \(NOAA\)](#)

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